

UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/813,557
Applicant: Paganessi, et al.
Filed: March 31, 2004
Title: GENERATION OF ACETYLENE FOR ON-SITE USE
IN CARBURIZATION AND OTHER PROCESSES
TC/A.U.: 1764
Examiner: Patel, Vinit H.
Confirmation No.: 4106
Docket No.: Serie 6390
Customer No.: 40582

Commissioner for Patents
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APPEAL BRIEF

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Sir:

This Brief is filed pursuant to the Notice of Appeal filed September 17, 2008.

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1. Real Parties In Interest

The real party in interest, AMERICAN AIR LIQUIDE INC., is the assignee of the entire title and interest in and to the subject application by virtue of an assignment recorded at the U.S. Patent and Trademark Office at: REEL/FRAME 014507/0598.

2. Related Appeals and Interferences

There are no related Appeals or Interferences.

3. Status of Claims

Claims 10, 12, and 15-18 are on appeal. Claims. As of the Office Action dated April 17, 2008, claims 1-9, 11, 13-14, and 19 had been canceled and claims 10, 12, and 15-18 were rejected. A complete copy of the current claims appears in the attached Appendix.

4. Status of Amendments

No claims were amended, withdrawn, added or canceled in an After Final Amendment.

5. Summary of the Claimed Subject Matter

Claim 10 is directed to a method of generating and supplying acetylene that comprises the following steps (page 2, line 10; page 5, line 5). Acetylene is generated in an acetylene generation device by directing at least one reactant feed stream including methane into the acetylene generation device (page 2, lines 12-13; page 2, lines 18-22; page 6, lines 14-16; page 7, lines 23-24). The acetylene generation device comprises an arc plasma reactor including an anode and a cathode disposed within the reactor (page 5, lines 29-31; page 6, lines 22-23; page 7, lines 6-7). The acetylene is generated by generating plasma within the reactor via a power supply connected to the anode and the cathode thereby yielding acetylene and hydrogen according to the formula:

$2\text{CH}_4 \longrightarrow \text{C}_2\text{H}_2 + 3\text{H}_2$ (page 6, lines 6-8; page 6, lines 14-17; page 6, lines 22-24; page 7, lines 24-27). The generated acetylene is directed to an acetylene processing device disposed in-line and downstream from the acetylene generation device (page 2, lines 13-15; page 5, lines 4-13; page 7, lines 2-4; page 7, lines 27-29). The acetylene processing device is operated to consume at least a portion of the acetylene (page 2, lines 15-17; page 5, lines 12-16).

Claims 12, 15-16, and 18 depend from claim 10 and thus include all of the limitations therein.

Claim 17 is directed to a method of generating and supplying acetylene that comprises the following steps (page 2, line 10; page 5, line 5). Acetylene is generated in an acetylene generation device by directing at least one reactant feed stream including methane into the acetylene generation device (page 2, lines 12-13; page 2, lines 18-22; page 6, lines 14-16; page 7, lines 23-24). The acetylene generation device comprises an arc plasma reactor including an anode and a cathode disposed within the reactor (page 5, lines 29-31; page 6, lines 22-23; page 7, lines 6-7). The acetylene is generated by generating plasma within the reactor via a power supply connected to the anode and the cathode thereby yielding acetylene and hydrogen according to the formula:

$2\text{CH}_4 \text{ -----} \rightarrow \text{C}_2\text{H}_2 + 3\text{H}_2$ (page 6, lines 6-8; page 6, lines 14-17; page 6, lines 22-24; page 7, lines 24-27). The generated acetylene is directed to an acetylene processing device disposed in-line and downstream from the acetylene generation device (page 2, lines 13-15; page 5, lines 4-13; page 7, lines 2-4; page 7, lines 27-29). The term "in-line", as used herein, refers to the acetylene generation system and the acetylene processing system being combined into a single system such that acetylene is generated and then subsequently consumed, for example, in a carburizing process, an oxyacetylene welding/cutting process, etc. (page 5, lines 9-13). The acetylene processing device is operated to consume at least a portion of the acetylene (page 2, lines 15-17; page 5, lines 12-16). Prior to directing the generated acetylene to an acetylene processing device, the generated acetylene is stored in at least one storage cylinder disposed in-line between the acetylene generation device and the acetylene processing device. The at least one storage cylinder is free of acetone.

6. Grounds of Rejection to be Reviewed on Appeal:

The issues presented on Appeal are:

A. Whether claims 10 and 12 are properly rejected under 35 USC 103(a) as obvious over U.S. Patent No. 3,256,358 ("Colton") in view of U.S. Patent No. 5,702,540 ("Kubota").

B. Whether claims 15-18 are properly rejected under 35 USC 103(a) as obvious over Colton in view of Kubota and U.S. Patent No. 5,960,634 ("Hook et al."), and U.S. Patent No. 7,033,446 ("Poor").

7. Arguments:

A) Claims 10 and 12 Were Improperly Rejected Under 35 U.S.C. § 103(a) As Obvious Over U.S. Patent No. 3,256,358 ("Colton") in view of U.S. Patent No. 5,702,540 ("Kubota").

The Examiner bears the initial burden of establishing a prima facie case of obviousness. See MPEP § 2142. To establish a prima facie case of obviousness three basic criteria must be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Third, there must be a reasonable expectation of success. See MPEP § 2143.

1) Colton and Kubota, alone or in combination fail to disclose, teach or suggest all of the limitations of claims 10 and 12.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claims 10 and 12 require that an acetylene processing device be disposed in-line and downstream from the acetylene generation device. As defined in the Specification at page 5, lines 9-13, the term "in-line", refers to the acetylene generation system and the acetylene processing system being combined into a single system such that acetylene is generated and then subsequently consumed. Colton and Kubota, alone or in combination fail to disclose this limitation.

As admitted by the Examiner in the April 17, 2008 Final Office Action, Colton fails to disclose directing the generated acetylene to an acetylene processing device disposed in-line and downstream from the acetylene generation device. To the extent that Colton addresses the necessary claimed relationship between an acetylene generation device and an acetylene processing device, it discloses that the reaction mixture leads to usual recovery means (column 4, lines 51-52). As described at lines 17-21 of page 1 of the instant Specification, acetylene is typically produced in bulk quantities and stored in tanks or cylinders for use in processes such as carburization. Thus, one of ordinary skill in the art would have likely concluded that Colton teaches recovery and storage of the generated acetylene in a tank or cylinder.

To the extent that Kubota addresses the above limitation, it discloses a carburizing gas source of acetylene dissolved in acetone that supplies acetylenic gas to a heating chamber (column 3, lines 41-42 and column 7, lines 7-10). The carburizing gas source is only described generically with no disclosure of generation of acetylene with the source. Thus, Kubota fails to disclose an acetylene generation device. Appellant respectfully submits that a generic source of acetylene dissolved in acetone does not constitute "an acetylene generation device". Rather, it constitutes an acetylene supplying device.

Even if the teachings of Colton and Kubota were to be combined in the manner suggested by the Examiner, the hypothetical combination would not include the necessarily claimed relationship that the acetylene processing device be disposed in-line and downstream of an acetylene generation device. Instead, one of ordinary skill in the art would likely have concluded that acetylene generated according to the teachings of Colton would have been stored in a tank or cylinder that is transported from the site of generation, such as an industrial gas company, to the heating chamber of Kubota where it is eventually consumed. In contrast, the claims require that the acetylene processing device be disposed in-line with the acetylene generation device.

Thus, Colton and Kubota, alone or in combination, fail to disclose each of the limitations of claims 10 and 12 and the Examiner has erred in rejecting them as so.

2) The Examiner has failed to provide sufficient reasoning why one of ordinary skill in the art would have combined the teachings of Colton and Kubota such that they would have resulted in the claimed subject matter.

The Federal Circuit has held that even if all of the elements of a claimed invention are found in a combination of prior art references, analysis requires "consideration of two factors:

- (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and
- (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342 (Fed. Cir. 2007)

In this regard the Federal Circuit points out that in *KSR International Co. vs. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) the Supreme Court "acknowledged the importance of identifying 'a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does' in an obviousness determination." *Takeda Chemical Industries, Ltd. v. Alphaphram Pty, Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007). Additionally, "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness". *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); cited with approval in *KSR Int'l Co.*, 127 at 1740-41.

In the April 17, 2008 Office Action, the Examiner stated that:

[I]t would have been obvious to one of ordinary skill in the art at the time of the invention to add the acetylene processing method of Kubota to the process of acetylene production of Colton, in order to provide an end use to the acetylene that is produced by Colton and further producing carburized steel (...).

Appellant respectfully points out that there is more than one way to provide an end use of acetylene produced by a process. In a first possibility, one of ordinary skill in the art could have generated acetylene (according to the teachings of Colton), stored the recovered acetylene in a usual recovery means such as a tank or cylinder (according to the teachings of Colton and the inventors' understanding of the prior art), and transported the tank or cylinder to the heating chamber of Kubota where it is consumed. Or, upon reading the Specification of the instant application, such a one could provide an acetylene processing device disposed in-line and downstream of an acetylene generation device. This latter possibility allows acetylene to be generated and consumed in-line. Simply because one of ordinary skill in the art may have found it obvious to use acetylene generated according to a particular method and used it in another particular method does not mean that such a one would have disposed the two methods in-line. The Examiner's reason for combining the teachings of Colton and Kubota does not address this distinction, but instead automatically and arbitrarily jumps to the conclusion that the generation method of Colton is disposed in-line with the consumption method of Kubota.

Additionally, in the August 28, 2008 Advisory Action, the Examiner stated that:

It is the examiner's position that merely combining a generation process with an end use of the material generated in the process is obvious to one of ordinary skill in the art.

Appellant respectfully asserts that the Examiner has failed to provide articulated reasoning with some rationale underpinning to support the legal conclusion of obviousness. Rather, the Examiner has merely provided the conclusory statement that it is obvious to combine a generation process with an end use of a material generated in a process. Additionally, this conclusory

statement fails to address the requirement that the generation process be disposed in-line with the process of use.

Thus, the Examiner has failed to provide a legally sufficient *prima facie* case of obviousness for claims 10 and 12 and the Examiner has erred in failing to do so.

B) Claims 15-18 Were Improperly Rejected Under 35 U.S.C. 103(a) As Obvious Over U.S. Patent No. 3,256,358 ("Colton") in view of U.S. Patent No. 5,702,540 ("Kubota"), U.S. Patent No. 5,960,634 ("Hook et al."), and U.S. Patent No. 7,033,446 ("Poor").

Appellant respectfully submits that Hook et al. and Poor fail to disclose, teach, or suggest all of the limitations of claims 15-18, including an acetylene processing device disposed in-line and downstream of an acetylene generation device. Moreover, the Examiner does not take the position that Hook et al. and Poor disclose this limitation. Rather, the Examiner cites these two references for purposes of addressing other claim limitations present in dependent claims 15-18. Because claims 15-18 depend from claim 10, and include all of its limitations, similar to claims 10 and 12 above, the Examiner has failed to provide a legally sufficient *prima facie* case of obviousness for claims 15-18.

CONCLUSION

The Examiner errs in finding that:

1. Claims 10 and 12 are unpatentable over Colton in view of Kubota;
and
2. Claims 15-18 are unpatentable over Colton in view of Kubota and
Hook et al. as evidenced by Poor.

Reversal of the Examiner is respectfully requested.

Respectfully submitted,

/Christopher J. Cronin/

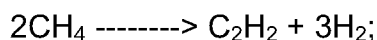
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8. Claims Appendix

Claims 1-9 (canceled)

Claim 10: A method of generating and supplying acetylene, comprising:
generating acetylene in an acetylene generation device by directing at least one reactant feed stream including methane into the acetylene generation device, wherein the acetylene generation device comprises an arc plasma reactor including an anode and a cathode disposed within the reactor, and the acetylene is generated by generating plasma within the reactor via a power supply connected to the anode and the cathode thereby yielding acetylene and hydrogen according to the formula:



directing the generated acetylene to an acetylene processing device disposed in-line and downstream from the acetylene generation device; and
operating the acetylene processing device to consume at least a portion of the acetylene.

Claim 11: (canceled)

Claim 12: The method of claim 10, wherein the process device comprises a carburization device, and operation of the carburization device comprises:
receiving and heat treating steel components within at least one chamber of the carburization device; and
introducing the generated acetylene into the at least one chamber to facilitate absorption and diffusion of carbon at the steel components.

Claims 13-14: (canceled)

Claim 15: The method of claim 10, further comprising:

prior to directing the generated acetylene to an acetylene processing device, storing the generated acetylene in at least one storage cylinder.

Claim 16: The method of claim 15, wherein the at least one storage cylinder is disposed in-line between the acetylene generation device and the acetylene processing device.

Claim 17: The method of claim 15, wherein the at least one storage cylinder is free of acetone.

Claim 18: The method of claim 10, further comprising:
directing the generated acetylene through at least one purification unit prior to directing the generated acetylene to an acetylene processing device.

Claim 19: (canceled)

9. Evidence Appendix

None.

10. Related Proceedings Appendix

None.